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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,858	04/28/2006	Shlomo Ruschin	27/281	4874
7590	07/13/2007		EXAMINER	
Mark Friedman Bill Polkinghorn 9003 Florin Way Upper Malboro, MD 20772			BOLDA, ERIC L	
		ART UNIT	PAPER NUMBER	
		3663		
			MAIL DATE	DELIVERY MODE
			07/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/577,858	RUSCHIN ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Eric Bolda	3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 14 June 2007.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 27-36 and 42-51 is/are pending in the application.
- 4a) Of the above claim(s) 33 and 48 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 27-32,34-36,42-47 and 49-51 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 28 April 2006 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____.                                     |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/7/2006</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|  | 6) <input type="checkbox"/> Other: _____.                         |

## DETAILED ACTION

### ***Election/Restrictions***

1. Applicant's election without traverse of invention III, claims 27-36 (in addition to new claims 42-51), and species A. gold dopant, B. substantially continuous laser source, in the reply filed on June 14, 2007 is acknowledged. Claims 27-32, 34-36, 42-47, and 49-51 read on the elected species.

### ***Claim Objections***

2. Claims 27and 42 are objected to because of the following informalities: the word "an" is missing from the phase "through indirect-gap semiconductor". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 27-32, 34-36, 42-47, and 49-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yegnanarayanan (US 2003/0142943) in view of Clap et al. ("Stimulated Raman scattering in silicon waveguides", Electronics Letters, vol. 38, Oct. 24, 2002, pp. 1352-1354, cited as reference FO in IDS filed Nove. 7, 2006).

With regard to claim 42, Yegnanarayanan disclose in Fig. 1 an optical device comprising a silicon semiconductor waveguide (108) doped with at least one element (gold or platinum, se para. [0026]). It is notoriously well-known that silicon is in indirect bandgap semiconductor. The waveguide (108) is arranged to have an optical signal coupled into it (para. [0027]). Yegnanarayanan do not specifically disclose an additional irradiating arrangement, with optical illumination at a wavelength shorter than that of the optical signal. The clause "so as to generate at least one added energy level at a known energy..corresponding to generation of a photon of a given wavelength" and "for irradiating a target region.." and "for directing an optical signal.." are essentially statements of intended or desired use. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference. See In re Pearson, 181 USPQ 641; In re Yanush, 177 USPQ 705; In re Finsterwalder, 168 USPQ 530; In re Casey, 512 USPQ 235; In re Otto, 136 USPQ 458; Ex parte Masham, 2 USPQ 2nd 1647.

See MPEP § 2114 which states:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ 2nd 1647

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than functions. In re Danly, 120 USPQ 528, 531.

Apparatus claims cover what a device is not what a device does. Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528.

In this case, the dopant creates at least one energy level inside the energy band gap Yegnanarayanan [0007]. The optical and irradiating arrangement is discussed below.

Yegnanarayanan do not specifically disclose a configuration of irradiating a target region of the body of semiconductor with optical illumination at a wavelength shorter than the wavelength of the added energy transition between the added energy level and an energy band of the semiconductor. However, Claps et al. teach a configuration of stimulated Raman scattering in silicon waveguides. The arrangement includes orthogonally polarized and overlapping optical pump and optical signal modes, with the pump wavelength shorter than the signal (Stokes) wavelength (p. 1353, end of 2<sup>nd</sup> para. and 3<sup>rd</sup> para.). It would have been obvious to one skilled in the art (e. g. an optical engineer) to try the Raman pump and signal optical arrangement of Claps et al., as an alternative or in addition to the drive voltage in the optical device of Yegnarayanan, for the purpose of overcoming losses in the planar waveguide circuit (Claps p. 1352, 2<sup>nd</sup> para.).

With regard to claim 27, Yegnanarayanan disclose a method of optical signal control of an optical signal passing through an indirect-gap semiconductor, comprising the steps of providing a body of indirect-gap semiconductor doped with at least one element (gold or platinum, se para. [0026]). It is notoriously well-known that silicon is an indirect bandgap semiconductor. The dopant creates at least one energy level inside the energy band gap Yegnanarayanan [0007], thereby enabling an energy transition

between said added energy level and an energy band of the semiconductor corresponding to generation of a photon of a range of wavelengths (at least one of a given wavelength). Fig. 2 shows that an optical signal of the given wavelength is directed to the target region (waveguide) of the semiconductor.

Yegnanarayanan do not specifically disclose a step of irradiating a target region of the body of semiconductor with optical illumination at a wavelength shorter than the wavelength of the added energy transition between the added energy level and an energy band of the semiconductor. However, Claps et al. teach a method of stimulated Raman scattering in silicon waveguides. The method includes inputting orthogonally polarized and overlapping optical pump and optical signal modes, with the pump wavelength shorter than the signal (Stokes) wavelength (p. 1353, end of 2<sup>nd</sup> para. and 3<sup>rd</sup> para.). It would have been obvious to one skilled in the art (e. g. an optical engineer) to try the Raman pump and signal optical arrangement of Claps et al., as an alternative or in addition to the drive voltage in the optical device of Yegnarayanan, for the purpose of overcoming losses in the planar waveguide circuit (Claps p. 1352, 2<sup>nd</sup> para.).

With regard to claims 28 and 43, the pump illumination in stimulated Raman scattering has a wavelength no greater than a wavelength of a photon corresponding the transition between the conduction gap and the valence band in the semiconductor (other wise the pump photons would be absorbed, see Claps 2<sup>nd</sup> para.)

With regard to claims 29-31 and 44-46, the dopant element is gold.

With regard to claims 32 and 47, the given (signal) wavelength is 1.54 microns (Claps, p. 1353, end of 2<sup>nd</sup> para.)

With regard to claims 36 and 51, the indirect-gap semiconductor is silicon (titles of both references).

With regard to claim 34 and 49, the irradiating pump is substantially continuous wave (CW, Claps, p. 1353, 2<sup>nd</sup> col. 1<sup>st</sup> para.)

With regard to claims 35 and 50, the target region of the pump light is the optical waveguide (see Fig. 2, Claps).

***Information Disclosure Statement***

5. The information disclosure statement filed on Nov. 7, 2006 has been considered by the Examiner.

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Eric Bolda whose telephone number is 571-272-8104. The examiner can normally be reached on M-F from 8:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Jack Keith, can be reached on 571-272-6878. Please note the fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Eric Bolda*

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